

ANTIBIOTICS

CHOICES FOR COMMON INFECTIONS

Antibiotic choices for common infections

Increasing antimicrobial resistance is now a worldwide problem, compounded by the lack of development of new antimicrobial medicines. This leaves the prudent use of antimicrobial medicines, along with infection control, as the major strategies to counter this emerging threat.

A safe and effective strategy for antibiotic use involves prescribing an antibiotic only when it is needed and selecting an appropriate and effective medicine at the recommended dose, with the narrowest spectrum of antimicrobial activity, fewest adverse effects and lowest cost.

General principles of antibiotic prescribing:

1. Only prescribe antibiotics for bacterial infections if:
 - Symptoms are significant or severe
 - There is a high risk of complications
 - The infection is not resolving or is unlikely to resolve
2. Use first-line antibiotics first
3. Reserve broad spectrum antibiotics for indicated conditions only

The following information is a consensus guide. It is intended to aid selection of an appropriate antibiotic for typical patients with infections commonly seen in general practice. Individual patient circumstances and local resistance patterns may alter treatment choices.

Subsidy information for medicines has not been included in the guide as this is subject to change. Fully-subsidised medicines should be prescribed as first-line choices, where possible. To check the subsidy status of a medicine see the New Zealand Formulary at: www.nzformulary.org or the Pharmaceutical Schedule online at: www.pharmac.health.nz

 Data on national resistance patterns are available from the Institute of Environmental Science and Research Ltd (ESR), Public Health Surveillance: www.surv.esr.cri.nz

Regional resistance patterns may vary slightly, check with your local laboratory.



For an electronic version of this guide see:
www.bpac.org.nz/antibiotics

Respiratory

COPD – acute exacerbations

Management	Many exacerbations are triggered by viruses and antibiotic treatment provides limited benefit. Antibiotic treatment is most helpful in patients with severe exacerbations (e.g. purulent sputum and increased shortness of breath and/or increased volume of sputum) and those with more severe airflow obstruction at baseline.
Common pathogens	Respiratory viruses, <i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , <i>Moraxella catarrhalis</i>
Antibiotic treatment	Acute exacerbation of COPD
First choice	Amoxicillin Adult: 500 mg, three times daily, for five days
Alternatives	Doxycycline Adult: 200 mg, on day one (loading dose), followed by 100 mg, once daily, on days two to five

Pertussis (Whooping cough)

Management	Antibiotic treatment is recommended to reduce transmission, if initiated within three weeks of the onset of the cough, as after this time most people are no longer infectious. Antibiotic treatment is unlikely to alter the clinical course of the illness unless given early (in the catarrhal stage). If the duration of the cough is unknown, give antibiotic treatment. Women who are in their third trimester of pregnancy should also receive antibiotic treatment, regardless of the duration of cough. The patient should be advised to avoid contact with others, especially infants and children, until at least five days of antibiotic treatment has been taken. Prophylactic antibiotics are recommended for high risk contacts: children aged less than one year, people caring for children aged less than one year, pregnant women, and people at risk of complications, e.g. severe asthma, immunocompromised.
Common pathogens	<i>Bordetella pertussis</i>

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Respiratory (continued)

Antibiotic treatment	Pertussis (Whooping cough)
First choice	Azithromycin (first-line for children, alternative for adults) Child < 45 kg: 10 mg/kg/dose, once daily, on day one, followed by 5 mg/kg/dose, once daily, on days two to five Adult and Child > 45 kg: 500 mg on day one, followed by 250 mg, once daily, on days two to five Erythromycin (first-line for adults, alternative for children aged over one year) Child: 10 mg/kg/dose, four times daily, for 14 days Adult: 400 mg, four times daily, for 14 days N.B. Erythromycin ethyl succinate is currently the only fully subsidised form of oral erythromycin available in New Zealand. Treatment and prophylaxis is recommended for 14 days with erythromycin ethyl succinate. There is evidence that seven days of treatment with erythromycin estolate (which has superior tissue and serum concentrations compared with the other erythromycin salts), is as effective as 14 days treatment. However, erythromycin estolate is not currently available in New Zealand.
Alternatives	None

Pneumonia – adult

Management	Chest x-ray is not routinely recommended, however, it may be appropriate when the diagnosis is unclear, there is dullness to percussion or other signs of an effusion or collapse, and when the likelihood of malignancy is increased, such as in a smoker aged over 50 years. Patients with one or more of the following features: age > 65 years, confusion, respiratory rate >30/min, systolic BP < 90 mm Hg, diastolic BP <60 mm Hg, have a predicted increased mortality rate and admission to hospital should be considered. Patients can generally be adequately treated with an agent that covers <i>S. pneumoniae</i>. Ciprofloxacin should not be used as it does not reliably treat infections due to <i>S. pneumoniae</i>.
Common pathogens	Respiratory viruses, <i>Streptococcus pneumoniae</i>, <i>Haemophilus influenzae</i>, <i>Mycoplasma pneumoniae</i>, <i>Chlamydia pneumoniae</i>, <i>Legionella pneumophila</i>, <i>Staphylococcus aureus</i>

Antibiotic treatment Pneumonia – adult	
First choice	Amoxicillin Adult: 500 mg – 1 g, three times daily, for five to seven days If <i>M. pneumoniae</i>, <i>C. pneumoniae</i> or <i>L. pneumophila</i> are suspected or if the patient has not improved after 48 hours, add either roxithromycin 300 mg, once daily, for seven days or doxycycline 200 mg, twice daily*, on day one, followed by 100 mg, twice daily, from days two to seven * Increased dose as recommended by ADHB pneumonia guidelines
Alternatives	Monotherapy with roxithromycin or doxycycline is acceptable for people with a history of penicillin allergy.

Pneumonia – child	
Management	Referral to hospital should be considered for any child with one or more of the following factors: aged less than six months, drinking less than half their normal amount, oxygen saturation $\leq 92\%$ on pulse oximetry, severe tachypnoea, decreased respiratory effort, temperature $< 35^{\circ}\text{C}$ or $> 40^{\circ}\text{C}$, decreased breath sounds or dullness to percussion, difficult to rouse. In addition, if there is no response to treatment in 24 – 48 hours, review diagnosis and consider referral to hospital.
Common pathogens	Respiratory viruses, <i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , <i>Mycoplasma pneumoniae</i> , <i>Staphylococcus aureus</i>
Antibiotic treatment Pneumonia – child	
First choice	Amoxicillin Child: 25 – 30 mg/kg/dose, three times daily, for five to seven days (maximum 500 mg/dose age three months to five years, 1000 mg/dose age $>$ five years)
Alternatives	Erythromycin Child: 10 – 12.5 mg/kg/dose, four times daily, for seven days N.B. Can be first-line in school-aged children where the likelihood of atypical pathogens is higher. Roxithromycin Child: 4 mg/kg/dose, twice daily, for seven to ten days N.B. Only available in tablet form, therefore only if the child can swallow tablets; whole or half tablets may be crushed.

Ear, nose and throat

Otitis externa – acute

Management Gentle debridement of the ear canal may be necessary to enhance the effectiveness of topical treatment. Suction cleaning is also a safe and effective method of debridement.

Most topical antibacterials are contraindicated in the presence of a perforated drum or grommets, however, they may need to be used if other treatment options have been unsuccessful.

Common pathogens *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa*, polymicrobial infections

Antibiotic treatment Otitis externa (acute)

First choice **Clioquinol + flumethasone** (Locorten Vioform)*
Adult and child > 2 years: 2 to 3 drops, twice daily, for 7 days

OR

Dexamethasone + framycetin + gramicidin (Sofradex)*
Adult and child: 2 to 3 drops, three to four times daily, for 7 days

Avoid excessive use, e.g. for longer than one week, as this may result in fungal infection which can be difficult to treat

Alternatives **Acetic acid 2%** (Vosol)* may be sufficient in mild cases.

Ciprofloxacin + hydrocortisone (Ciproxin HC)* if *Pseudomonas* suspected.

Flucloxacillin if there is spreading cellulitis or the patient is systemically unwell; also consider referral to hospital.

* Currently subsidised brand

Otitis media

Management **Antibiotic treatment is usually unnecessary.**

Consider antibiotics for children at high risk such as those with systemic symptoms, aged less than six months, aged less than two years with severe or bilateral disease, or with perforation and/or otorrhoea. Also consider antibiotics in children who have had more than three episodes of otitis media.

Otherwise treat symptomatically, e.g. paracetamol, and arrange follow up or give a “back pocket” prescription to be dispensed if no improvement in next 24 – 48 hours.

Common pathogens Respiratory viruses, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*

Antibiotic treatment	Otitis media
First choice	Amoxicillin Child: 15 mg/kg/dose, three times daily, for five days (seven to ten days if age < two years, underlying medical condition or perforated ear drum) Use 30 mg/kg/dose, three times daily, for five to seven days in severe or recurrent infection (maximum 500 mg/dose age three months to five years, 1000 mg/dose age > five years)
Alternatives	Co-trimoxazole Child > 6 weeks: 0.5 mL/kg/dose oral liquid (40+200 mg/5 mL), twice daily, for five to seven days (maximum 20 mL/dose) If a child can swallow tablets, co-trimoxazole 80+400 mg tablets can be used (one tablet is equivalent to 10 mL of co-trimoxazole oral liquid) N.B. Co-trimoxazole should be avoided in infants aged under six weeks, due to the risk of hyperbilirubinaemia.

Pharyngitis

Management	Most pharyngitis is of viral origin. The major benefit of treating <i>Streptococcus pyogenes</i> pharyngitis is to prevent rheumatic fever, therefore antibiotic treatment is recommended for those at increased risk of rheumatic fever, i.e. if the patient has a history of past rheumatic fever, is of Maori or Pacific ethnicity, or is living in a lower socioeconomic area of the North Island, and is aged 3 – 45 years. Patients who fulfil one or more of these criteria, and who have features of group A streptococcus infection: temperature >38°C, tender cervical nodes, tonsillar swelling or exudate, and no cough, especially if aged 3–14 years, should have a throat swab taken and empiric antibiotic treatment either started immediately or if <i>Streptococcus pyogenes</i> is isolated from the swab. Avoid amoxicillin if infectious mononucleosis (EBV) is suspected due to an increased risk of rash.
Common pathogens	Respiratory viruses, <i>Streptococcus pyogenes</i>

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Ear, nose and throat (continued)

Antibiotic treatment	Pharyngitis
First choice	Phenoxymethylpenicillin (Penicillin V) Child: 10 mg/kg/dose, twice daily, for ten days (maximum 500 mg/dose) Adult: 500 mg, twice daily, for ten days OR Amoxicillin Child <30 kg: 750 mg, once daily, for ten days Child >30 kg: 1500 mg, once daily, for ten days OR (if compliance is likely to be an issue) IM benzathine penicillin (stat) Child < 20 kg: 450 mg (600 000 U) Child > 20 kg: 900 mg (1 200 000 U) Adult: 900 mg (1 200 000 U)
Alternatives	Erythromycin Child: 20 mg/kg/dose, twice daily or 10 mg/kg/dose, four times daily, for ten days (maximum 1 g/day) Adult: 400 mg, twice daily, for ten days N.B. Co-trimoxazole does not have reliable activity against <i>S. pyogenes</i> or eradicate pharyngeal carriage and should not be used.

Sinusitis – acute

Management	Most patients with sinusitis will not have a bacterial infection. Even for those that do, antibiotics only offer a marginal benefit and symptoms will resolve in most patients in 14 days, without antibiotics. Consider antibiotics for patients with severe sinusitis symptoms (e.g. purulent nasal discharge, nasal congestion and/or facial pain or pressure) for more than five to seven days plus any of the following features: fever, unilateral maxillary sinus tenderness, severe headache, symptoms worsening after initial improvement.
Common pathogens	Respiratory viruses, <i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , <i>Moraxella catarrhalis</i> , anaerobic bacteria
Antibiotic treatment	Sinusitis (acute)
First choice	Amoxicillin Child: 15 mg/kg/dose, three times daily, for seven days Use 30 mg/kg/dose, three times daily, for seven days in severe or recurrent infection (maximum 500 mg/dose age three months to five years, 1000 mg/dose age > five years)

Antibiotic treatment	Sinusitis (acute) – continued
Alternatives	Doxycycline Adult and child > 12 years: 200 mg on day one, followed by 100 mg, once daily, on days two to seven Amoxicillin clavulanate (if symptoms persist despite a treatment course of amoxicillin) Child: 10 mg/kg/dose (amoxicillin component), three times daily, for seven days (maximum 500 mg/dose amoxicillin component) Adult: 500+125 mg, three times daily, for seven days

Eyes

Conjunctivitis	
Management	Can be viral, bacterial or allergic. Bacterial infection is usually associated with mucopurulent discharge. Most bacterial conjunctivitis is self-limiting and the majority of people improve without treatment, in two to five days. In newborn infants, consider <i>Chlamydia trachomatis</i> or <i>Neisseria gonorrhoeae</i>, in which case, do not use topical treatment. Collect eye swabs, and refer to a Paediatrician.
Common pathogens	Viruses, <i>Streptococcus pneumoniae</i>, <i>Haemophilus influenzae</i>, <i>Staphylococcus aureus</i> Less commonly: <i>Chlamydia trachomatis</i> or <i>Neisseria gonorrhoeae</i>
Antibiotic treatment	Conjunctivitis
First choice	Chloramphenicol 0.5% eye drops Adult and child > 2 years: 1 – 2 drops, every two hours for the first 24 hours, then every four hours +/- chloramphenicol eye ointment at night until 48 hours after symptoms have cleared
Alternatives	Fusidic acid eye gel Adult and child: 1 drop, twice daily until 48 hours after symptoms have cleared

Periorbital cellulitis – see Cellulitis (Page 11)

Bacterial meningitis and suspected meningococcal sepsis

Management Immediately refer all people with suspected meningococcal disease (meningitis with non-blanching rash or meningococcal septicaemia) or bacterial meningitis (without a non-blanching rash) to hospital. Give benzylpenicillin before transport to hospital, as long as this does not delay the transfer.

Notifiable on suspicion.

Common pathogens *Neisseria meningitidis*, *Streptococcus pneumoniae*
Less common: *Listeria monocytogenes*, *Haemophilus influenzae*

Antibiotic treatment Bacterial meningitis and suspected meningococcal sepsis

First choice **Benzylpenicillin** (penicillin G)
Child < one year: 300 mg IV or IM
Child one to nine years: 600 mg IV or IM
Adult and child > ten years: 1.2 g IV or IM

Alternatives **Ceftriaxone**
Adult and child: 50 – 100 mg/kg up to 2 g IV or IM

N.B. Almost any parenterally administered antibiotic in an appropriate dosage will inhibit the growth of meningococci, so if benzylpenicillin or ceftriaxone are not available, give any other penicillin or cephalosporin antibiotic.

Bites – human and animal (Includes injury to fist from contact with teeth)	
Management	Clean and debride wound thoroughly and assess the need for tetanus immunisation. All infected bites should be treated with antibiotics. Prophylactic antibiotic treatment is appropriate for human and cat bites, or dog bites if severe or deep, and any bites that occur to the hand, foot, face, tendon or ligament, or in immunocompromised people. Consider referral to hospital if there is bone or joint involvement.
Common pathogens	Polymicrobial infection, <i>Pasteurella multocida</i>, <i>Capnocytophaga canimorsus</i> (cat and dog bites), <i>Eikenella corrodens</i> (fist injury), <i>Staphylococcus aureus</i>, streptococci and anaerobes
Antibiotic treatment	Bites – human and animal
First choice	Amoxicillin clavulanate Child: 10 mg/kg/dose (amoxicillin component), three times daily, for seven days (maximum 500 mg/dose, amoxicillin component) Adult: 500+125 mg, three times daily, for seven days
Alternatives	Adult and child > 12 years: Metronidazole 400 mg, three times daily, + doxycycline 200 mg on day one, followed by 100 mg, once daily, on days two to seven Metronidazole + co-trimoxazole is an alternative for children aged under 12 years (doxycycline contraindicated)

Boils

Management Most lesions may be treated with incision and drainage alone. Antibiotics may be considered if there is fever, surrounding cellulitis or co-morbidity, e.g. diabetes, or if the lesion is in a site associated with complications, e.g. face. For management of recurrent boils, see: "Recurrent skin infections" (Page 14).

Common pathogens *Staphylococcus aureus*
Consider MRSA if there is a lack of response to flucloxacillin.

Antibiotic treatment Boils

First choice **Flucloxacillin**
Child: 12.5 mg/kg/dose, three to four times daily, for seven days
Adult: 500 mg, four times daily, for five to seven days
OR (if flucloxacillin not tolerated in children)
Cephalexin
Child: 12.5 – 25 mg/kg/dose, twice daily, for five to seven days

Alternatives **Cephalexin**
Adult: 500 mg, four times daily, for five to seven days
Erythromycin
Child aged < 12 years: 20 mg/kg/dose, twice daily, or 10 mg/kg/dose, four times daily, for five to seven days (maximum 1 g/day)
Adult: 800 mg, twice daily, or 400 mg, four times daily, for five to seven days
Co-trimoxazole (if MRSA present):
Child > 6 weeks: 0.5 mL/kg oral liquid (40+200 mg/ 5 mL), twice daily, for five to seven days (maximum 20 mL/dose)
N.B. Co-trimoxazole should be avoided in infants aged under six weeks, due to the risk of hyperbilirubinaemia.
Adult and child >12 years: 160+800 mg (two tablets), twice daily, for five to seven days

Cellulitis

Management Keep affected area elevated (if applicable) for comfort and to relieve oedema. Assess response to treatment in seven days. Consider referral for IV antibiotics if cellulitis is severe or systemic symptoms are present, e.g. fever, nausea, vomiting.

For periorbital or facial cellulitis, in all but very mild cases consider referral for IV antibiotics.

Common pathogens *Streptococcus pyogenes*, *Staphylococcus aureus*, Group C or Group G streptococci

Antibiotic treatment Cellulitis

First choice

Flucloxacillin
Child: 12.5 mg/kg/dose, four times daily, for seven days
Adult: 500 mg, four times daily, for five to seven days

OR (if flucloxacillin not tolerated)

Cephalexin
Child: 12.5 mg/kg/dose, four times daily, for seven to ten days (maximum 500 mg/dose)
Adult: 500 mg, four times daily, for seven days

Alternatives

Erythromycin
Child < 12 years: 20 mg/kg/dose, twice daily, or 10 mg/kg/dose, four times daily, for seven to ten days (maximum 1 g/day)
Adult: 800 mg, twice daily, or 400 mg, four times daily, for seven days

Co-trimoxazole (if MRSA present):
Child > 6 weeks: 0.5 mL/kg/dose oral liquid (40+200 mg/5 mL), twice daily, for five to seven days (maximum 20 mL/dose)

N.B. Co-trimoxazole should be avoided in infants aged under six weeks, due to the risk of hyperbilirubinaemia.

Adult and child aged over 12 years: 160+800 mg (two tablets), twice daily, for five to seven days

Diabetic foot infections

Management Antibiotics (and culture) are not necessary unless there are signs of infection in the wound. However, in people with diabetes and other conditions where perfusion and immune response are diminished, classical clinical signs of infection are not always present, so the threshold for suspecting infection and testing a wound should be lower.

Referral to hospital should be considered if it is suspected that the infection involves the bones of the feet, if there is no sign of healing after four weeks of treatment, or if other complications develop.

Common pathogens Early infection is usually due to *Staphylococcus aureus* and/or streptococci. Later infection may be polymicrobial with a mixture of Gram-positive cocci, Gram-negative bacilli and anaerobes.

Antibiotic treatment Diabetic foot infections

First choice **Amoxicillin clavulanate**
Adult: 500+125 mg, three times daily, for five to seven days

Alternatives **Cephalexin** 500 mg, four times daily, + **metronidazole** 400 mg, twice to three times daily, for five to seven days

OR (for patients with penicillin hypersensitivity)

Co-trimoxazole 160+800 mg (two tablets), twice daily, + **clindamycin*** 300 mg, three times daily, for five to seven days

* Requires specialist endorsement for > 4 capsules

Impetigo

Management Remove crusted area and apply topical antibiotic ointment to localised areas of impetigo. Keep affected areas covered and exclude from school or preschool until 24 hours after treatment initiated. Assess and treat other infected household members.

Oral antibiotics are recommended for more extensive, widespread, impetigo, or if systemic symptoms are present.

Recurrent impetigo may be the result of chronic nasal carriage of *Staphylococcus aureus* (patient or household contact), or re-infection from fomite colonisation, e.g. clothing, linen, and may require decolonisation. See: "Recurrent skin infections" (Page 14).

N.B. *Streptococcus pyogenes* has caused outbreaks of necrotising fasciitis in residential care facilities, and if this is suspected it is important to use systemic treatment to eradicate carriage, and prevent infection to others.

Common pathogens	<i>Streptococcus pyogenes</i> , <i>Staphylococcus aureus</i>
Antibiotic treatment	Impetigo
First choice	Topical (localised patches): Fusidic acid 2% cream or ointment applied three times daily, for seven days Oral (extensive lesions): Flucloxacillin Child: 12.5 mg/kg/dose four times daily, for seven days (maximum 500 mg/dose) Adult: 500 mg, four times daily, for seven days OR Cephalexin Child: 12–25 mg/kg/dose, twice daily, for seven days Adult: 500 mg, four times daily or 1 g, twice daily, for seven days
Alternatives	If topical treatment fails, use oral treatment as above. Erythromycin (alternative oral treatment) Child aged < 12 years: 20 mg/kg/dose, twice daily, or 10 mg/kg/dose, four times daily, for seven to ten days (maximum 1 g/day) Adult: 800 mg, twice daily, or 400 mg, four times daily, for seven days Co-trimoxazole (if MRSA present) Child > 6 weeks: 0.5 mL/kg/dose oral liquid (40+200 mg/5 mL), twice daily, for five to seven days (maximum 20 mL/dose) N.B. Co-trimoxazole should be avoided in infants aged under six weeks, due to the risk of hyperbilirubinaemia. Adult and child > 12 years: 160+800 mg (two tablets), twice daily, for five to seven days

Mastitis

Management	Treat with antibiotic and continue to breast feed from both breasts. This is an important component of treatment and poses no risk to the infant.
Common pathogens	<i>Staphylococcus aureus</i> in lactating women, <i>S. aureus</i> and anaerobes in non-lactating females, or in males
Antibiotic treatment	Mastitis
First choice	Flucloxacillin Adult: 500 mg, four times daily, for seven days

Skin (continued)

Antibiotic treatment	Mastitis – continued
Alternatives	Cephalexin Adult: 500 mg, four times daily, for seven days Erythromycin Adult: 400 mg, four times daily, for seven days Treat mastitis in males or non-lactating females with amoxicillin clavulanate 500+125 mg, three times daily, for seven days

Recurrent skin infections	
Management	Take a swab of the lesion to rule out MRSA infection. Decolonisation should not be attempted until the lesions have healed. Take a nasal swab and if indicated by results, perform staphylococcal decolonisation. The patient should be advised to shower daily for one week using triclosan 1% or chlorhexidine 4% body wash, applied with a clean cloth, with special attention to axillae, groin and perineum. Also recommend hot drying, ironing or bleaching towels, facecloths, sheets, other linen and underclothes for the duration of treatment. For children, adding half cup of unscented household bleach (sodium hypochlorite 3–5%) to a bath, followed by a fresh water rinse, two to three times weekly, may be effective and preferable to showering with triclosan, particularly if the child has underlying atopic eczema. Treatment of other household contacts with recurrent infection should occur at the same time. There is some evidence that skin infections are reduced if these measures are performed for all household contacts, but compliance and motivation may be barriers.

Antibiotic treatment	Recurrent skin infections
First choice	For clearance of staphylococcal carriage: Depending on susceptibility Fusidic acid 2% cream or ointment Mupirocin 2% ointment (usually reserved for MRSA) Apply inside the nostrils with a cotton bud or finger, twice daily, for five days N.B. Excessive use of topical antibiotics has led to high rates of resistance in <i>S. aureus</i>.
Alternatives	Nil

Gastrointestinal

Campylobacter enterocolitis

Management	Most people will recover with symptomatic treatment only. Antibiotics have little impact on the duration and severity of symptoms but eradicate stool carriage. Treatment is indicated for severe or prolonged infection, for pregnant women nearing term and for people who are immunocompromised. Treatment may also be appropriate for food handlers, childcare workers and those caring for immunocompromised patients. Campylobacter enterocolitis is a notifiable disease.
Common pathogens	<i>Campylobacter jejuni</i>
Antibiotic treatment	Campylobacter enterocolitis
First choice	Erythromycin Child: 10 mg/kg/dose, four times daily, for five days Adult: 400 mg, four times daily, for five days

Clostridium difficile colitis

Management	Disease is due to overgrowth of the colon with <i>Clostridium difficile</i> which produces toxins. A common cause is broad spectrum antibiotic treatment. Discontinue current antibiotic treatment if/when possible – in some cases this may lead to clinical resolution of symptoms. Antibiotic treatment is recommended in adults if the patient has diarrhoea or other symptoms consistent with colitis, and a positive test for <i>C. difficile</i> toxin. Consider referral to hospital if there is evidence of worsening colitis. Relapse may occur after treatment. In children, detection of <i>C. difficile</i> commonly represents colonisation rather than pathological infection, and antibiotic treatment is not generally required in the community setting. Antidiarrhoeals, e.g. loperamide, should be avoided as the toxin may be retained and worsen colitis.
Common pathogens	<i>Clostridium difficile</i>

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Gastrointestinal (continued)

Antibiotic treatment	<i>Clostridium difficile</i> colitis
First choice	Metronidazole Adult: 400 mg, three times daily, for 10 days
Alternatives	Vancomycin If patient has not responded to two courses of metronidazole; discuss with an infectious diseases physician or clinical microbiologist. Oral vancomycin (using the injection product) may be required.

Giardiasis	
Management	Antibiotic treatment is recommended for people who have tested positive for the organism, and symptomatic contacts. Avoid lactose-containing foods for one month after treatment. Giardiasis is a notifiable disease.
Common pathogens	<i>Giardia lamblia</i>
Antibiotic treatment	Giardiasis
First choice	Ornidazole Child < 35 kg: 125 mg/3 kg/dose,* once daily, for one to two days Adult and child > 35 kg: 1.5 g, once daily, for one to two days * N.B. Dose is per 3 kg bodyweight; ornidazole is only available in tablet form, tablets may be crushed, child dosing equates to one quarter of a tablet per 3 kg. OR Metronidazole Child: 30 mg/kg/dose, once daily, for three days (maximum 2 g/dose) Adult: 2 g, once daily, for three days
Alternatives	For treatment failure with ornidazole: Exclude re-infection from asymptomatic family contacts, e.g. children Metronidazole Child: 10 mg/kg/dose, three times daily, for seven days, (maximum 400 mg/dose) Adult: 400 mg, three times daily, for seven days N.B. Nitazoxanide (hospital treatment) may be considered for recurrent treatment failures.

Salmonella enterocolitis

Management	Routine treatment with antibiotics is usually unnecessary and may prolong excretion. Treat patients with severe disease, those who are immunocompromised and those with prosthetic vascular grafts. Discuss appropriate treatment for children with an infectious diseases physician. Salmonellosis is a notifiable disease.
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Common pathogens	<i>Salmonella enteritidis</i> , <i>Salmonella typhimurium</i>
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Antibiotic treatment **Salmonella enterocolitis**

First choice	Ciprofloxacin Adult: 500 mg, twice daily, for three days
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Alternatives	Co-trimoxazole Adult: 160+800 mg (two tablets), twice daily, for three days
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Genito-urinary

Bacterial vaginosis

Management	Women with bacterial vaginosis are often asymptomatic. It is not usually necessary to treat bacterial vaginosis unless symptoms are present or an invasive procedure is planned, e.g. insertion of an IUD or termination of pregnancy. Treatment of male sexual contacts is not usually necessary.
Common pathogens	<i>Gardnerella vaginalis</i> , <i>Bacteroides</i> , <i>Peptostreptococci</i> , <i>Mobilunculus</i> and others
Antibiotic treatment	Bacterial vaginosis
First choice	Metronidazole Adult: 400 mg, twice daily, for seven days, or 2 g, stat, if adherence to treatment is a concern, however, this is associated with a higher relapse rate
Alternatives	Ornidazole 500 mg, twice daily, for five days or 1.5 g, stat may be used instead of metronidazole, but is not recommended in women who are pregnant as no study data is available

Chlamydia

Management	Advise avoidance of unprotected sexual intercourse for seven days after treatment has been initiated, and for at least seven days after any sexual contacts have been treated, to avoid re-infection. A test of cure should be done five weeks after initiation of treatment in pregnant women, if a non-standard treatment has been used, e.g. amoxicillin, or if symptoms do not resolve. Repeat STI screen in three months for patients with confirmed chlamydia.
Common pathogens	<i>Chlamydia trachomatis</i>
Antibiotic treatment	Chlamydia
First choice	Azithromycin Adult: 1 g, stat OR Doxycycline Adult: 100 mg, twice daily, for seven days. Do not use in pregnancy or breast feeding.
Alternatives	Amoxicillin 500 mg, three times daily, for seven days (only in women who are pregnant who are unable to take azithromycin)

Epidiymo-orchitis

Management

Epidiymo-orchitis may occur due to a variety of pathogens, but STI pathogens are more likely in males aged < 35 years, with a history of more than one sexual partner in the past 12 months, and urethral discharge.

Test for chlamydia, gonorrhoea and UTI.

If symptoms are initially severe or signs and symptoms do not resolve (or worsen) after 24 to 48 hours, refer to hospital.

Common pathogens

Majority due to *Chlamydia trachomatis* or *Neisseria gonorrhoeae*. Also *E. coli*, *Bacteroides* species, *Gardnerella vaginalis*, *Mycoplasma hominis*, *Ureaplasma urealyticum*, *Trichomonas vaginalis*, *Streptococcus agalactiae* and others

Antibiotic treatment

Epidiymo-orchitis

First choice

If STI pathogens suspected:

Ceftriaxone

Adult: 500 mg IM, stat (make up with 2 mL of lignocaine 1% or according to data sheet)

AND

Doxycycline

Adult: 100 mg, twice daily, for 14 days

If UTI pathogens suspected:

Ciprofloxacin

Adult: 500 mg, twice daily, for 10 days

Alternatives

Amoxicillin clavulanate 500+125 mg, three times daily, for 10 days (if UTI pathogens suspected and contraindications to quinolones)

Genito-urinary (continued)

Gonorrhoea

Management	Advise avoidance of unprotected sexual intercourse for seven days after treatment has been initiated, and for at least seven days after any sexual contacts have been treated, to avoid re-infection. A test of cure should be done five weeks after initiation of treatment in pregnant women, if a non-standard treatment has been used or if symptoms do not resolve. Repeat STI screen in three months for patients with confirmed gonorrhoea. As co-infection with chlamydia is very common, azithromycin is also routinely given.
Common pathogens	<i>Neisseria gonorrhoeae</i>
Antibiotic treatment	Gonorrhoea
First choice	Ceftriaxone Adult: 500 mg IM, stat (make up with 2 mL of 1% lignocaine or according to data sheet) AND Azithromycin Adult: 1 g, stat (including in pregnancy and breastfeeding)
Alternatives	Ciprofloxacin 500 mg, stat + azithromycin 1 g, stat, only if the isolate is known to be ciprofloxacin sensitive. Resistance rates vary by location.

Pelvic inflammatory disease

Management	Pelvic inflammatory disease (PID) is usually caused by a STI, particularly in women aged under 25 years, women who have had recent change of sexual partner or women with a previous history of gonorrhoea or chlamydia. Diagnosis of PID is clinical, taking into account the history, clinical findings and results of tests. However, STI tests will often be negative and a low threshold for treatment is appropriate. Treatment should cover infection with gonorrhoea, chlamydia and anaerobes. Women with severe pelvic inflammatory disease and women who are pregnant require referral for specialist assessment. Hospital admission may be required for IV antibiotics.
Common pathogens	<i>Chlamydia trachomatis</i> , <i>Neisseria gonorrhoeae</i> and others

Antibiotic treatment Pelvic inflammatory disease	
First choice	Ceftriaxone Adult: 500 mg IM, stat (make up with 2 mL of 1% lignocaine or according to data sheet) AND Doxycycline Adult: 100 mg, twice daily, for 14 days AND Metronidazole Adult: 400 mg, twice daily, for 14 days (metronidazole may be discontinued if not tolerated)
Alternatives	Ceftriaxone 500 mg IM, stat + azithromycin 1 g on day one and day eight is an alternative if compliance is likely to be poor. Ornidazole may be considered as an alternative, if metronidazole is not tolerated.

Pyelonephritis – acute	
Management	Only treat in the community if mild symptoms, e.g. low fever and no nausea or vomiting. If systemically unwell, dehydrated or vomiting refer to hospital for IV treatment. A urine culture and susceptibility test should be performed. Infants and children with pyelonephritis should be referred to hospital for treatment. Nitrofurantoin or trimethoprim alone are not appropriate choices for pyelonephritis.
Common pathogens	<i>Escherichia coli</i> , <i>Proteus spp.</i> , <i>Klebsiella spp.</i> , <i>Enterococcus spp.</i>
Antibiotic treatment Acute pyelonephritis	
First choice	Amoxicillin clavulanate Adult: 500+125 mg, three times daily, for 10 days Co-trimoxazole Adult: 160+800 mg (two tablets), twice daily, for 10 days
Alternatives	Ciprofloxacin 500 mg, twice daily, for seven days – but should be reserved for isolates resistant to initial empiric choices and avoided during pregnancy

Genito-urinary (continued)

Trichomoniasis

Management Advise avoidance of unprotected sexual intercourse for seven days after treatment has been initiated, and for at least seven days after any sexual contacts have been treated, to avoid re-infection.

Due to low sensitivity, culture of urethral swabs is rarely positive in males, even if infection is present, therefore empirical treatment of male sexual contacts is recommended without testing, along with a STI check.

A test of cure is not usually required unless there is a risk of re-exposure.

Common pathogens *Trichomonas vaginalis*

Antibiotic treatment Trichomoniasis

First choice **Metronidazole**

Adult: 2 g, stat

Can be used in women who are pregnant or breast feeding, but advise to avoid breastfeeding for 12–24 hours after dose

Alternatives

For those intolerant of the stat dose, use **metronidazole** 400 mg, twice daily, for seven days

Ornidazole 1.5 g, stat or 500 mg, twice daily, for five days may be used instead of metronidazole, but is not recommended in women who are pregnant as no study data is available

Urethritis – acute non-specific

Management Non-specific urethritis is a diagnosis of exclusion. A urethral swab and first void urine sample should be taken to exclude gonorrhoea and chlamydia (or use combination testing if available). Treat sexual contacts. Advise avoidance of unprotected sexual intercourse for seven days after treatment has been initiated, and for at least seven days after any sexual contacts have been treated, to avoid re-infection.

Patients with symptoms persisting for more than two weeks, or with recurrence of symptoms, should be referred to a sexual health clinic or urologist.

Common pathogens Urethritis not attributable to *Neisseria gonorrhoeae* or *Chlamydia trachomatis* is termed non-specific urethritis and there may be a number of organisms responsible, e.g. *Ureaplasma urealyticum*, *Mycoplasma genitalium*, *Trichomonas vaginalis*

Antibiotic treatment Acute non-specific urethritis	
First choice	Azithromycin Adult: 1 g, stat OR Doxycycline Adult: 100 mg, twice daily, for seven days If purulent discharge, treat as for gonorrhoea, i.e. ceftriaxone 500 mg IM, stat + azithromycin 1g, stat
Alternatives	Nil

Urinary tract infection (UTI) – adult	
Management	Antibiotic treatment is indicated for all people who are symptomatic. Asymptomatic bacteriuria requires antibiotic treatment in women who are pregnant but not in elderly women or patients with long-term indwelling urinary catheters. Non-pregnant females with uncomplicated UTI do not require a urine culture. However, urine culture is recommended in males, women who are pregnant, and those who fail to respond to empiric treatment within two days. Women who are pregnant should have repeat urine culture one to two weeks after completing treatment to ensure cure.
Common pathogens	<i>Escherichia coli</i> , <i>Staphylococcus saprophyticus</i> , <i>Proteus spp.</i> , <i>Klebsiella spp.</i> , <i>Enterococcus spp.</i>
Antibiotic treatment Urinary tract infection (UTI) – adult	
First choice	Trimethoprim Adult: 300 mg, once daily, for three days (avoid during the first trimester of pregnancy) OR Nitrofurantoin Adult: 50 mg, four times daily, for five days (avoid at 36+ weeks in pregnancy, and in significant renal impairment) Treat for seven days in pregnant women and in males
Alternatives	Norfloxacin Adult: 400 mg, twice daily for three days – but should be reserved for isolates resistant to initial empiric choices and avoided during pregnancy

Urinary tract infection (UTI) – child

Management	Refer children aged under three months, those with severe illness, or those with recurrent infection, to hospital. Also consider referral of children aged under six months. Children aged over six months, without renal tract abnormalities, and who do not have acute pyelonephritis, may be treated with a short course (three days) of antibiotics. All children with suspected UTI should have a urine culture collected as a clean specimen (clean catch, catheter, midstream urine) as it may be a marker for previously undetected renal malformations, particularly in younger children. In older children it can be a marker for bladder and/or bowel dysfunction.  For information on collecting a urine specimen in children, see: “Managing urinary tract infections in children”, BPJ 44 (May, 2012).
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Common pathogens *Escherichia coli*, *Proteus spp.*, *Klebsiella spp.*, *Enterococcus spp.*

Antibiotic treatment **Urinary tract infection (UTI) – child**

First choice	Co-trimoxazole Child: 0.5 mL/kg/dose oral liquid (40+200 mg/ 5 mL), twice daily, for three days (maximum 20 mL/dose) If a child can swallow tablets, co-trimoxazole 80+400 mg tablets can be used (one tablet is equivalent to 10 mL of co-trimoxazole oral liquid)
Alternatives	Cefaclor Child: 8 – 10 mg/kg/dose, three times daily, for three days (maximum 500 mg/dose) Amoxicillin clavulanate Child: 10 mg/kg/dose (amoxicillin component), three times daily, for three days (maximum 500 mg/dose, amoxicillin component)

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Respiratory

COPD – acute exacerbations
Pertussis (Whooping cough)
Pneumonia – adult
Pneumonia – child

Ear, nose and throat

Otitis externa – acute
Otitis media
Pharyngitis
Sinusitis – acute

Eyes

Conjunctivitis

CNS

Bacterial meningitis and suspected meningococcal sepsis

Skin

Bites – human and animal (includes injury to fist from contact with teeth)
Boils
Cellulitis

Diabetic foot infections
Impetigo
Mastitis
Recurrent skin infections

Gastrointestinal

Campylobacter enterocolitis
Clostridium difficile colitis
Giardiasis
Salmonella enterocolitis

Genito-urinary

Bacterial vaginosis
Chlamydia
Epidiymo-orchitis
Gonorrhoea
Pelvic inflammatory disease

Pyelonephritis – acute
Trichomoniasis
Urethritis – acute non-specific
Urinary tract infection – adult
Urinary tract infection – child

